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OTOLOGICAL REVIEW.

By CLARENCE J. BLAKE, OF BOSTON.

1. N. RÜDINGER. *Atlas des Menschlichen Gehörorgans*, Dritte Lieferung. E. Stahl, München, 1875.

2. RÜDINGER. *Atlas of the Osseous Anatomy of the Human Ear*. Translated and edited by Clarénce J. Blake, M.D. A. Williams & Co., Boston, 1874.

3. SEDLEY TAYLOR. *Science of Music*. D. Appleton & Co., New York.

4. F. COYTEUX. *Études sur la Physiologie*. Chap. XI., *De L'ouïe*. G. Masson, Paris, 1875.

5. ADOLPH FICK. *Compendium der Physiologie des Menschen*, Kap. 4, *Gehörsinn*. Wilhelm Braumüller. Wien, 1874.

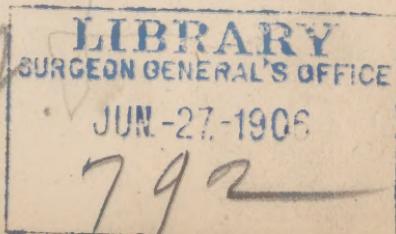
6. DE LA CHARRIÈRE, ISAMBERT, et KRISHABER. *Annales des Maladies de l'Oreille et du Larynx*. G. Masson, Paris, 1875.

7. J. PATTERSON CASSELLS. *Fungous Ear Diseases*. Medico-Chirurgical Soc., Glasgow, 1874.

8. C. H. BURNETT. *An Objective Noise in the Ear accompanied by Spasmodic Retraction of the Membrana Tympani and of the Velum Palati*. *Philadelphia Medical Times*, February, 1875.

1. THE third and final volume of Prof. Rüdinger's *Atlas* concludes a labor extending over a period of more than ten years, which has contributed to otological literature one of its best works for reference and for illustration. The application of photography to the illustration of papers and treatises upon the anatomy of the ear has, as the author says in his preface, the advantage of affording a faithful reproduction of the delicate structures of the ear, which may serve not only for purposes of study and instruction, but may also assist the student in the reproduction of the anatomical preparations. The first volume contained eight photographic and two lithographic plates; the second volume, eight photographic and four lithographic plates; and the third volume, thirty-eight photographic

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plates, comprising in all one hundred and nine figures. The photographs for the first and second volumes are from the celebrated atelier of Albert, in Munich, and are remarkable for their softness of outline and delicacy of finish. The illustrations of the third volume are by Gemoser and Waltl; the softness of outline which rendered the pictures of Albert particularly pleasing is wanting in these illustrations, but this is in a measure largely due to the character of the subjects which rendered some retouching of the negatives necessary, and to the methods of reproduction. The first four plates of the third volume comprise sections of the temporal bone. Of these the nine figures in Plates III. and IV., are particularly valuable as showing the relations of the mastoid cells and middle and internal ears.

Figs. 2 and 5, Plate III., give vertical sections of the middle ear, which display the important points of the walls of that cavity.

Figs. 1, 2, 3 and 4, Plate IV., present horizontal sections of the temporal bone, displaying

1. The external auditory canal, tympanic cavity, the stapes in position, mastoid cells, intercal auditory canal, the cochlea, and vestibule.

3. The external auditory canal and tympanum, with the ossicula in position, the Eustachian tube, vestibule and aqueductus vestibuli and cochleæ.

These figures would prove especially valuable in an enlarged form in explaining the relations of the external, middle and internal ear to a class.

Plate V., 1. Right membrana tympani with the membrana propria and malleus viewed from within.

2. Section horizontally through the articulation of incus and stapes, with the attachment of the tendon of the *musculus stapedius*.

3. Section horizontally of the *fenestra ovalis*, in connection with the posterior segment of the stapes.

Plate VI. Sections horizontally of the malleus, showing its relations to the membrana tympani, and of the articulation of the malleus and incus.

Plate VII. Corrosion preparations of the labyrinth, magnified four and one-half diameters.

Plate VIII, The osseous and membranous labyrinth, showing the osseous labyrinth free from the investing bone, the semi-circular canals, vestibule and commencement of the first whorl of the cochlea being opened in order to exhibit the membranous parts in position.

Three sections of the cochlea in different planes, magnified twelve diameters.

Plate IX. Schema of the labyrinth of the mammalia, after Waldeyer, and the membranous labyrinth of the vestibule and semicircular canals with the nerves, magnified nine diameters.

Plate X. Two sections of the cartilaginous and membranous canals from a three and four months' foetus respectively, magnified eighty-four diameters, and a section of the same parts in the adult, under the same magnifying power, and also a cross section of the membranous semi-circular canal, showing the papillæ.

Plate XI. Section through the first whorl of the cochlea of a kitten, after Boettcher, and a section from apex to base of the cochlea of the human foetus at about the fourth month.

Plate XII. Upper portion of section through the posterior root of the nervus acusticus, after Henle.

Sacculus rotundus of the foetus, with the nervus saccularis major.

Cross section of the ampulla membranacea of the pike.

Vertical section of the organ of Corti, with the nerves, from a dog, after Henle, and the facial and auditory nerves with the ganglia.

Plate XIII. Comprises four figures, showing the base of the brain and origin of the auditory nerve, the inner surface of the base of the cranium, the nervus trigeminus and otic ganglion viewed from within, and the nerves of the tympanic cavity viewed from without. This plate is followed by a wood-cut, giving a schematic representation of the tympanic plexus which will prove of great service to the student.

Plate XIV. Has also four figures representing the tympanic cavity with the nervus facialis and chorda tympani.

The nervus auriculo-temporalis and its distribution in the external ear. The nerves of the outer ear, and finally the ramus auricularis nervi vagi. The work concludes with an index of the plates and figures comprised in the three volumes.

While anything more than an enumeration of the contents of such an atlas would hardly come within the scope of such a review as the present, it is impossible to dismiss this admirable work without a thought of the labor which its production implies and the judgment shown by its author in the arrangement of its several parts. The form of the work also makes it easily available for reference, and, the plates being unbound, may be mounted for use in lectures or for class instruction.

2. The *Atlas of the Osseous Anatomy of the Human Ear* is a reproduction of the eight photographic plates of the first volume of Rüdinger's *Atlas*, with English text, the plates having been made by Albert for the purpose. There is in addition a frontispiece plate from a preparation made by the editor, with descriptive text, and as the *Atlas* was intended

for class uses, a note has been added, giving the distribution of nerves and blood-vessels.

3. Among the more gratifying evidences of the growth of general scientific culture is the demand for works of a so-called popular scientific character. The works of this kind embrace a wide range, from the studies in biology for young beginners, for instance, to the more elaborate treatises embodied in our scientific reviews, published to meet the wants of advanced students. The work of Mr. Sedley Taylor stands midway between the two extremes, consisting of a series of lectures delivered at the South Kensington Museum and Academy of Music, and aiming at placing before persons unacquainted with mathematics an intelligible and succinct account of that part of the theory of sound, which constitutes the physical basis of the art of music. No preliminary knowledge, save of arithmetic and of the musical notation in common use, is assumed to be possessed by the reader.

The first, second, and third chapters treat of sound in general and the mode of its transmission, on loudness and pitch, and on resonance. The fourth chapter on quality, the low-connecting, constituent tones, experimental analysis of musical sounds, by means of the piano-forte, and Helmholtz's theory of musical quality, concludes the first part of the book. Chapter fifth treats on the essential mechanism of the principal musical instruments, considered in reference to quality, and concludes with the synthetic confirmation of Helmholtz's general theory of quality by means of the tests with combined tuning-fork tones.

Chapters sixth, seventh, and eighth treat of the connection between quality and mode of vibration, the interference of sound, and on concord and discord, and chapter ninth entitled consonant triads, treats concisely of the rules for the employment of vibration fractions, major and minor groups, and the relation between their members, the notation of thorough bass, and the effects of major and minor chords.

In concluding the final chapter on pure intonation and temperament, the author speaks of the relation of the theory of consonance and dissonance to the aesthetics of music and of the fact that the order of merit of the ear in consonance is not the same as the mechanical order; the concords classed in order, according to their greater or less freedom from dissonance are, first, the octave, then the fifth, fourth, major third and sixth, and minor third and sixth, this being the purely physical classification. The ear, however, places thirds and sixths first, then the fourth and fifth, and the octave last of all.

The author is inclined to attribute the predilection of the ear for thirds and sixths over other concords to circumstances connected with its per-

ception of key relations, though unable to give a satisfactory account of them.

The author further considers that the ear possesses a marked distinction from other organs of sense in that it enjoys in alternation with consonant chords, dissonances of so harsh a description as to be barely endurable when sustained by themselves.

4. The eleventh chapter—comprising twenty pages—of the very comprehensive work of M. Coyteux, is devoted to the physiology of the ear, giving firstly, short explanations of the terms; intensity, tone, harmony, and timbre.

The external, middle, and internal ear are then considered in order.

Concerning the auricle, the author is disposed to favor the view of Burchanon, that the acuteness of hearing is more or less in proportion to the extent of the angle at which the auricle is set upon the head, and agrees with the conclusion drawn from Savart's experiment that the function of the auricle is not to reflect vibrations into the external auditory canal, but to convey to that passage the vibrations which are excited in its own substance, and in this connection no reference is made to the more recent experiments of Berthold, Urbantschitsch, and other German and English observers. Following a review of the opinions of Béclard, Longet, Bourget, Bernard, and others, upon the office of the membrana tympani, and the manner of transmission of sonorous vibrations, M. Coyteux concludes that the sound perceived is conveyed not only by the membrana tympani, but through the cranial bones to the membrana tympani, and the air contained in the tympanic cavity; that in this manner, together with the varying tension of the membrana tympani, the sympathetic vibration to various tones is provided for, and that the contraction of the musculus tensor tympani serves not only to maintain the membrana tympani at a proper degree of tension, but also by changing the tension of the membrana tympani to vary the tension of the air contained within the tympanic cavity, according to the sounds communicated to the contained air through the cranial bones.

The ossicula serve to receive, to condense, so to speak, all the vibrations received through the membrana tympani, or the tympanic cavity, and to transmit them to the labyrinthine fluid by means of the *fenestra ovalis*; in relation to the further office of the ossicula, the author gives the explanations of Savart and Longet with regard to protection of the deeper-seated and more delicate structures. In addition to the office of the Eustachian tube in maintaining the equilibrium of atmospheric pressure on both sides of the membrana tympani, which is briefly mentioned, the author gives the opinions, in which he concurs, of MM. Bressa and

Longet, that this canal serves for the transmission of the voice, existing as it does in all animals having voice, and being absent in many which make no sound. Following a description of the anatomy of the internal ear in brief, is the consideration of the physiology of this organ. It being generally admitted that the sonorous vibrations are communicated through the *fenestra ovalis* and *fenestra rotunda*, the author considers that the former serves to convey the vibrations passing through the chain of bones, and the latter the vibrations of the air contained within the tympanic cavity. That the former mode of transmission is the more important of the two is deduced from the fact, shown by comparative anatomy, that where only one of the *fenestrae* persists it is the *fenestra ovalis* with a more or less complete chain of bones.

The opinions of Müller, that the membranes of the two *fenestrae* transmit sounds varying not only in intensity, but also in timbre, and of Auzoux, that the membrane of the *fenestra rotunda* plays a special rôle in counterbalancing the pressure upon the labyrinthine fluid made by the base of the stapes, are quoted favorably, and the theory of Helmholtz in regard to the offices of the rods of Corti, the hairs of Schultze, and the otoliths is considered as a whole inadmissible.

5. Professor Fick devotes fourteen pages of his "Compendium of Physiology" to the organ of hearing, giving a résumé of the later investigations in the anatomy of the ear, followed by a description of the functions of its several parts, which represents the general standard of German observers of to-day very faithfully. "The distance of the origin of a sound," says Prof. Fick, "we determine by the intensity of the perception." The determination of the direction of the sound is largely due to the greater intensity of the perception in one ear or the other, and the position of the auricle seems to have an influence in determining the direction also, especially as to whether the point of origin of the sound is before or behind the observer. If the auricle is pressed upon with the thumb, and an artificial auricle formed by the remaining fingers, it is very difficult to determine whether the sound comes from before or behind. In regard to the office of the semi-circular canals, the author inclines to the opinion that they assist in maintenance of equilibrium, founded upon the experiments upon disturbances of motion, made by Flourens, Löwenberg, Boettcher, and other writers.

6. It is always a pleasure to welcome a new publication in the interest of special science, likely to prove the medium through which fresh contributions are to be made to the growing knowledge of the subjects of which it treats. The first number of the *Annales des Maladies de l'Oreille et du Larynx* commends itself, therefore, at once to consideration.

It is intended, as its authors say in their preface, to fill an existing gap in the publications consecrated to special subjects ; without the pretence that the journal responds to a want generally felt, it is hoped that it may serve such readers as are desirous of exploring new fields. In regard to the otological portion of the journal, we may be permitted to quote from the preface as setting forth opinions of its authors—while the profession generally has adopted means which permit the minute investigation of morbid phenomena, the use of the otoscope, and the examination of the ear, under proper illumination, still remains in the hands of the specialist. How many physicians are there who, in the course of a grave disease, an eruptive or typhoid fever, take the pains to examine the ear with proper care ? In the course of the more severe fevers, and particularly in those in which the complication of angina is common, deafness is a frequent symptom ; it attracts, however, comparatively little attention, and cerebral complications are considered as the cause of symptoms which are nothing more than the result of an inflammation of the ear. If a discharge of the ear occurs, followed by a degree of amelioration of the symptoms, this is considered as a favorable crisis, without exciting investigation into the degree of the accompanying angina, and without suggesting to the practitioner that a lasting infirmity may be the consequence. Another example may be quoted in the otitis of new-born children, an affection quite as frequent as ophthalmia ; while the latter malady is the object of care and of apprehension, the former, on the contrary, is treated too lightly ; the nurse is allowed to inject milk into the ears, and the disease does not become a subject of concern until some months later, when the sad prospect of deaf-mutism suggests itself. An examination of the ears of children, who are the subjects of this deplorable infirmity, shows that in seventy-nine out of a hundred the hearing was lost after birth. In a certain number of these cases this might have been prevented.

The advance which has been made of late years in the study of diseases of the ear, and the communications on this subject appearing in the general medical journals of France, induce the editors to provide a means for the publication of such papers in a special journal, and the intimate relationship between diseases of the ear, the nasal passages, the pharynx, and the larynx, have determined them in uniting in the same publication those affections which are studied by means of the otoscope, the rhinoscope, and the laryngoscope.—The spirit which incites MM. Isambert, Krishaber, and Ladreit de la Charière, in presenting their new journal to the general medical public, thereby filling a gap in French periodical medical literature, and which is indicated in their preface, should be emu-

lated by editors of other special journalistic publications. It is the part of the specialist, not only to keep himself informed in the advances made in his particular branch of science, and to contribute to them himself so far as possible, but also to spread his information among his brethren in general practice, contributing thereby as much as possible to the general advance of his profession.

The otological portion of the first number of the "Annales" is represented by a paper by Ladreit de la Charrière on Ménière's disease, which, while presenting nothing new with regard to this affection, gives the analysis of a series of cases, in which the symptom of vertigo was the result of other lesions than those of the internal ear primarily, and a paper by D. M. Levi, entitled "Observation d'Otite parasitaire," making, we believe, the first contribution to the rapidly growing list of cases of this affection, from a French source. The patient, a soldier, came under treatment in August, 1873, for relief from purulent inflammation of the left ear, having also had an acute inflammation of the right ear previously. Under treatment the discharge was entirely, and the deafness partially, relieved.

In February, 1874, the patient returned, complaining of pain and subjective noises in both ears. An examination of the right ear revealed a whitish mass, lining the external auditory canal, and covering all but the anterior superior portion of the membrana tympani. This false membrane being removed and preserved in glycerine, and then examined under a power of three hundred diameters, revealed well-marked mycelium and sporules of *aspergillus nigricans*. The treatment consisted in warm syringing, the instillation of a solution of nitrate of silver, one gramme to ten of water, and, later, phenic acid one gramme to three hundred of water. At the end of three weeks the canal and membrana tympani had resumed their normal appearance. In connection with the ætiology of this disease, it is worthy of note, that the patient had but lately recovered from a disease which implied continued maceration of the parts, later the seat of the parasitic growth; that he was in the habit of sleeping, when off duty, in the garrison-stable upon mouldy hay, and that he had never used any instillation of oil, simple or medicated, which might possibly have favored the development of the fungus, as has been suggested by Bezold.

7. Dr. J. Patterson Cassels also has contributed the first case of parasitic disease of the ear recorded in Great Britain in the British Medical Journal of May, 1874, and now presents a second case in a paper read before the Medico-Chirurgical Society of Glasgow. The patient was a young lady who had suffered, as in the case of M. Levi above quoted,

from purulent inflammation of the ear, from which she had been relieved. In August, 1872, she had sensations of fulness and burning heat in the right ear, accompanied by occasional lancinating pain; in a short time the left ear became the seat of similar sensations which continued for more than a year, relieved only by occasional syringing with warm water, which brought away large, flaky-white masses. When first examined by Dr. Cassels, the hearing for the watch was reduced in the right ear to $\frac{4}{5}$, and in the left ear to $\frac{1}{2}$; the right meatus was free from cerumen, and presented a dry, scaly, white appearance. The membrana tympani presented a peculiar appearance, which was found, on closer examination, to be due to the presence of a finely-developed under-growth of mycelium, springing out of which were numerous fructiferous hyphens or filaments, bearing black sporangia, of a spherical form. Portions of this fungus were detached and removed, and proved, under the microscope, to be perfect examples of *aspergillus nigricans*.

Examination of the left ear showed it to be affected with apparently the same disease, but the appearances were totally different. The meatus was filled with large masses of dead epithelium interspersed with delicate points of a dark or almost black color. A specimen of this débris was examined under the microscope, and proved to be made up of exuviated epithelial cells and other débris; the black points being the spore heads of the same fungus. In a few days, under treatment, the parasite and its effects were gone.

The treatment pursued by Dr. Cassels in this case was that previously advocated and largely employed by him in other forms of ear-diseases, namely, the application of alcohol. Syringing with tepid water alone, the author says, without the subsequent use of a parasiticide, may suffice to effect a cure; "but for my own part, especially after studying the experiments of Küchenmeister and the evidence which the history of this case affords, I would not trust to it alone, nor would I rely upon a watery solution of any of the numerous parasiticides, with the exception, perhaps, of the hypochlorate of lime. I quite concur in the opinion expressed by Hallier, and confirmed by Küchenmeister, that, of all parasiticides, those into the composition of which alcohol enters are the most effective; further, that the efficiency is in reality due to the spirit alone. Hitherto I have used alcohol either diluted or in full strength, and have good grounds to be satisfied with its action.

The principle which may be laid down as a guide to those who desire to use this substance is this: do not irritate the already inflamed tissues; in other words, let the strength of the alcoholic solution fall far short of causing pain to the patient."

8. Among the more interesting cases lately reported in American journals, mention may be made of the occurrence of an objective noise in the ear observed by Dr. Burnett.

The patient was a Japanese lad eighteen years old, who applied for treatment of a chronic suppurative inflammation of the left middle ear. While making the necessary examination, a peculiar snapping noise was heard emanating from the right ear, so distinct as to be heard at a distance of ten feet. This sound was also distinctly heard from the nostril of the right side, but not at all from the left ear. The snapping sounds began during the summer of 1874, after the attack of acute inflammation in the left ear.

At first no sign of movement of the membrana tympani could be observed with the occurrence of the snapping sound, but a manometer, placed in the right ear, showed a negative fluctuation of 0.5 mm. at each snapping sound, thus demonstrating a retraction of the membrana tympani.

Examination of the fauces revealed an elevation and retraction of the velum palati with each snapping sound in the ear and each manometric depression.

Deglutition, respiration, and speech exercised a marked influence over the spasmotic condition; on holding the breath, the contractions in the velum palati and the snapping noise in the ear ceased entirely, but recurred so soon as the patient resumed breathing. During ordinary respiration the spasms amounted to twenty in the minute, or, increasing the rapidity of breathing, they rose to thirty in the minute. During ordinary speech no spasms occurred. They were not in regular succession nor synchronous with the respiration, but occurred in groups of twos and threes with a pause between. They so far interfered with the hearing of the patient, as to induce him to hold his breath when he wished to hear distinctly; and a watch which was heard only on contact while the snapping noise occurred, was heard at a distance of two inches, when arrested by holding the breath. Tuning-forks, held before the ear, appeared to the patient to rise in pitch at each spasm.

The snapping sounds, but not the spasmotic elevations in the velum, could be arrested in two ways, by throwing the head backward as far as possible, and by pressing the finger firmly against the velum, and pushing it upward toward the pharyngeal opening of the right Eustachian tube; the powerful twitching with the usual intervals of repose could be plainly felt by the finger, but the snapping noise ceased.

Pressure upon the left half of the velum palati, and immediately upon the pharyngeal opening of the left Eustachian tube, revealed no twitch-

ing in that region, nor did it influence in any way the spasms and noises on the opposite side of the pharynx and in the right ear.

Dr. Burnett's case is a further and very clear substantiation of the view, which he quotes, of Politzer and Luschka, that in many cases such noises as those described are due to a spasmodic contraction of the muscles of the velum palati, producing a sudden separation of the anterior from the posterior wall of the pharyngeal portion of the Eustachian tube.

